

WHAT IS CLAIMED IS:

1. A superconductivity magnet apparatus comprising:

a split-type electromagnet including two superconductivity coil blocks having respective coils made by winding a superconductivity wire around each bobbin, wherein said superconductivity coil blocks are placed so as to face each other having the gap between said superconductivity coil blocks in the axial direction of a magnetic field generated by said coils;

a support structure body provided at said gap to support an electromagnetic force working between said superconductivity coil blocks, and made of a material having a relative magnetic permeability in the range 1.000 to 1.002;

a refrigerant container for cooling said split-type electromagnet to keep said coils in a super-conductive state; and

an access port for accessing to a measurement space provided at the center of said split-type electromagnet or in the proximity of there through said gap.

2. A superconductivity magnet apparatus according to claim 1, wherein said each superconductivity coil block is configured by winding a superconductivity wire around each bobbin to make each coil, and stacking the coils each other to form a coaxial multi-layer coil structure.

3. A superconductivity magnet apparatus according to claim 1, wherein said material having a relative magnetic permeability in the range 1.000 to 1.002 is a copper, an aluminum alloy, an titan alloy or an FRP.

4. A superconductivity magnet apparatus according to claim 1, wherein said support structure body has an axis symmetry on the basis of the axis of said

magnetic field.

5. A superconductivity magnet apparatus according to claim 1, wherein an area constituted by said material having a relative magnetic permeability in the range 1.000 to 1.002 is configured so as to have magnetically an axis

5 symmetry on the basis of the axis of said magnetic field.

6. A superconductivity magnet apparatus according to claim 1, further having another access port for allowing an access to said measurement space from a external position of said superconductivity coil blocks in the axial direction of said magnetic field.

10 7. A superconductivity magnet apparatus comprising:

a split-type electromagnet including the first superconductivity coil block having coils made by winding a superconductivity wire around coaxial multiple bobbins and a second superconductivity coil block configured like said first superconductivity coil block, further placing said first and second

15 superconductivity coil blocks having the gap in the state of facing mutually so that the axes of magnetic fields generated by their respective coils coincide on the direction;

a refrigerant container containing said split-type electromagnet and a refrigerant for cooling said split-type electromagnet so as to keep the coils in a
20 super-conductive state;

a measurement space provided at the center of said split-type electromagnet or in the proximity of there; and

an access port for allowing an access to said measurement space through said gap between said first and second superconductivity coil blocks,

25 wherein said bobbins of said first superconductivity coil block and said

bobbins of said second superconductivity coil block are integrated with each other to form a single assembly, sandwiching a support structure body made of a material having a relative magnetic permeability in the range 1.000 to 1.002.

8. A superconductivity magnet apparatus according to claim 7, wherein said
5 first and second superconductivity coil blocks comprises the coils made by winding a superconductivity wire around respective bobbins, and by stacking the coils each other to form a coaxial multi-layer coil structure.

9. A superconductivity magnet apparatus according to claim 7, wherein said material having a relative magnetic permeability in the range 1.000 to 1.002 is
10 a copper, an aluminum alloy, a titan alloy or an FRP.

10. A superconductivity magnet apparatus according to claim 7, wherein said bobbins of said first superconductivity coil block and said bobbins of said second superconductivity coil block are each made of a material having a relative magnetic permeability in the range 1.000 to 1.002.

15 11. A superconductivity magnet apparatus according to claim 8, wherein said first and second superconductivity coil blocks having said coaxial multi-layer structure comprising:

inside coils made of Nb₃Sn and placed at locations in the proximity of said center of said split-type electromagnet;

20 outside coils made of a NbTi alloy and placed at locations far away from said center of said split-type electromagnet;

inside bobbins for winding said inside coils and made of a titan alloy having a relative magnetic permeability in the range 1.000 to 1.002; and

outside bobbins for winding said outside coils and made of a high
25 manganese steel having a relative magnetic permeability in the range 1.000 to

1.002.

12. A superconductivity magnet apparatus according to claim 7, wherein said bobbins are each made of stainless steel and said support structure body is made of copper.

5 13. A superconductivity magnet apparatus according to claim 12, wherein said stainless steel and said copper are integrated to form a single body in an HIP process.

14. A superconductivity magnet apparatus according to claim 7, wherein said access port is made of a material having a relative magnetic permeability in the
10 range 1.000 to 1.002.

15. A superconductivity magnet apparatus according to claim 7, further having another access port for allowing an access to said measurement space from an external position of said split-type electromagnet to said measurement space in the axial direction of said magnetic field.

15 16. A superconductivity magnet apparatus having a configuration according to claim 1, wherein said superconductivity magnet apparatus is used in nuclear magnetic resonance apparatus.

17. A superconductivity magnet apparatus having a configuration according to claim 7, wherein said superconductivity magnet apparatus is used in nuclear
20 magnetic resonance apparatus.

18. A superconductivity magnet apparatus, wherein

a split-type electromagnet is configured by joining two superconductivity coil blocks which have coils made by winding a superconductivity wire around each bobbin, and said superconductivity coil blocks are placed so as to face
25 each other having the gap between said superconductivity coil blocks in the

axial direction of a magnetic field generated by said coils;

said split-type electromagnet is contained in a refrigerant container so as to keep said coils in a super-conductive state;

an access port is provided in said gap so as to can insert a sample to a
5 measurement space located at the center of said split-type electromagnet or in the proximity of there the gap, and

a configuration element included in an area within a radius of 200 mm from said center of said split-type electromagnet and having an axis-unsymmetrical structure on basis of axis of said magnetic field, is made of
10 a material having a relative magnetic permeability in the range 1.000 to 1.002.

19. A superconductivity magnet apparatus according to claim 18, wherein the strength of said magnetic field at said center of said split-type electromagnet is at least 10 teslas.